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October 2003

Processes

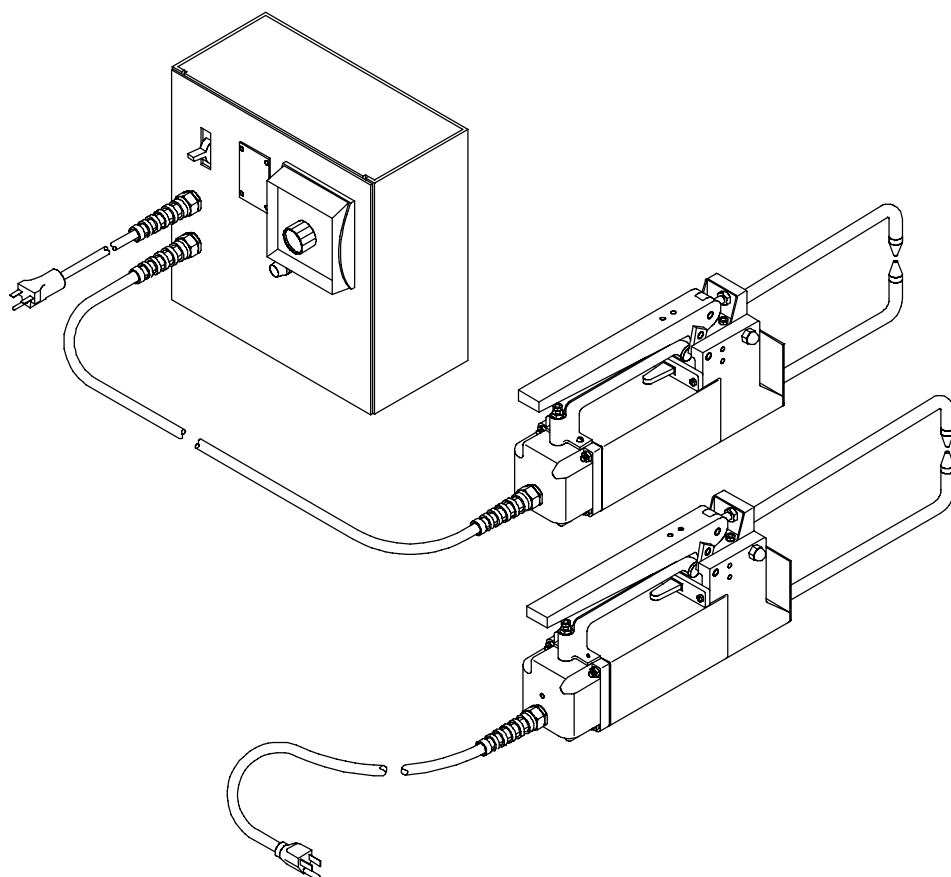


Resistance Spot
Welding

Description



MSW-41, MSW-41T, LMSW-52, And LMSW-52T Portable Resistance Spotwelders



OWNER'S MANUAL



Visit our website at
www.MillerWelds.com

From Miller to You

Thank you and congratulations on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001:2000 Quality System Standard.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.



Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**



Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ Marks a special safety message.

☞ Means "Note"; not safety related.



This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Resistance Spot Welding Hazards

▲ The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.

▲ Only qualified persons should install, operate, maintain, and repair this unit.

▲ During operation, keep everybody, especially children, away.



SPOT WELDING can cause fire.

Sparks can fly off from the weld. The flying sparks, hot workpiece, and hot equipment can cause fires, burns, and explosions.

- Protect yourself and others from flying sparks and hot metal.
- Do not spot weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the weld. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Do not spot weld on closed containers such as tanks or drums.
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Do not exceed the equipment rated capacity.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.

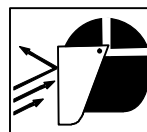


ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The input power circuit and machine internal circuits are also live when power is on. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).

- Properly install and ground this equipment according to this manual and national, state, and local codes.
- Check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet – always double-check the supply ground before applying power.
- When making input connections, attach the grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord and ground conductor for damage or bare wiring – replace immediately if damaged – bare wiring can kill. Check ground conductor for continuity.
- Turn off all equipment when not in use.
- For water-cooled equipment, check and repair or replace any leaking hoses or fittings. Do not use any electrical equipment if you are wet or in a wet area.
- Use only well-maintained equipment. Repair or replace damaged parts at once.
- Wear a safety harness if working above floor level.
- Keep all panels, covers, and guards securely in place.



FLYING SPARKS can cause injury.

Very often sparks fly off from the joint area.

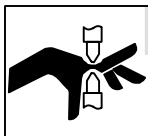
- Wear approved face shield or safety goggles with side shields.
- Wear protective garments such as oil-free, flame-resistant leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap. Synthetic material usually does not provide such protection.
- Protect others in nearby areas by using approved flame-resistant or noncombustible fire curtains or shields. Have all nearby persons wear safety glasses with side shields.



HOT METAL can cause burns.

Wear gloves or allow cooling period before servicing tongs or tips.

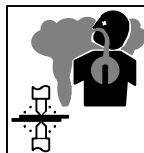
- Always wear welding-type, insulated gloves when using this equipment.
- Do not touch workpiece, tips, or tongs with bare hands.
- Allow tongs and tips to cool before touching.



MOVING PARTS can cause injury.

The tong tips, tongs, and linkages move during operation.

- Keep away from moving parts.
- Keep away from pinch points.
- Do not put hands between tips.
- Keep all guards and panels securely in place.
- OSHA and/or local codes may require additional guarding to suit the application.



FUMES can be hazardous.

Coatings, cleaners, paints, and platings can produce fumes when welded. Breathing these fumes can be hazardous to your health.

- Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the weld to remove fumes.
- In confined spaces, use an approved air-supplied respirator.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, or if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, coatings, and cleaners.

1-3. Additional Symbols For Installation, Operation, And Maintenance



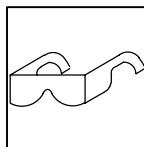
FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install or operate unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



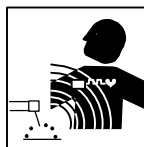
FALLING EQUIPMENT can cause injury.

- Use equipment of adequate capacity to lift the unit.
- Have two people of adequate physical strength lift portable units.
- Secure unit during transport so it cannot tip or fall.



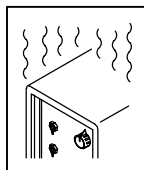
FLYING METAL or DIRT can injure eyes.

- Wear approved safety glasses with side shields or wear face shield.



MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near resistance spot welding operations.



OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce duty cycle before starting to weld again.

1-4. California Proposition 65 Warnings

- ▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**
- ▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

For Gasoline Engines:

- ▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

For Diesel Engines:

- ▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

1-5. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon

committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined.

SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

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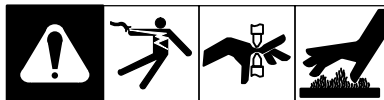
2-1. Signification des symboles



Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ Identifie un message de sécurité particulier.

☞ Signifie NOTA ; n'est pas relatif à la sécurité.



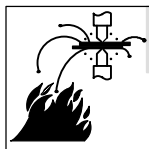
Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

2-2. Dangers liés au soudage par points

▲ Les symboles représentés ci-dessous sont utilisés dans ce manuel pour attirer l'attention et identifier les dangers possibles. Lorsque vous rencontrez un symbole, prenez garde et suivez les instructions afférentes pour éviter tout risque. Les instructions en matière de sécurité indiquées ci-dessous ne constituent qu'un sommaire des instructions de sécurité plus complètes fournies dans la normes de sécurité énumérées dans la Section 2-4. Lisez et observez toutes les normes de sécurité.

▲ Seul un personnel qualifié est autorisé à installer, faire fonctionner, entretenir et réparer cet appareil.

▲ Pendant le fonctionnement, maintenez à distance toutes les personnes, notamment les enfants de l'appareil.



LE SOUDAGE PAR POINTS peut provoquer un incendie.

Des étincelles peuvent être projetées de la soudure. La projection d'étincelles ainsi que les pièces et équipements chauds peuvent provoquer des incendies, des brûlures et des incendies.

- Protégez-vous, ainsi que toute autre personne travaillant sur les lieux, contre les étincelles et le métal chaud.
- Ne soudez pas par points dans un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Déplacez toute matière inflammable se trouvant dans un périmètre de 10 m de la pièce à souder. Si cela est impossible, couvrez-les de housses approuvées et bien ajustées.
- Des étincelles du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Afin d'éliminer tout risque de feu, soyez vigilant et gardez toujours un extincteur à portée de main.
- Ne soudez pas par points sur un récipient fermé tel un réservoir ou un bidon.
- Ne soudez pas si l'air ambiant est chargé de particules, gaz, ou vapeurs inflammables (vapeur d'essence, par exemple).
- Avant de souder, retirez toute substance combustible de vos poches telles qu'un briquet au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Ne dépassez pas la puissance permise de l'équipement.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.



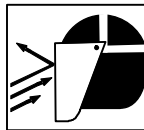
UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.

Le fait de toucher à une pièce électrique sous tension peut donner une décharge fatale ou entraîner des brûlures graves. L'alimentation d'entrée et les circuits internes de l'appareil sont également actifs lorsque le poste est sous tension. Un poste

incorrectement installé ou inadéquatement mis à la terre constitue un danger.

- Ne touchez pas aux pièces électriques sous tension.
- Portez des gants isolants et des vêtements de protection secs et sans trous.

- Coupez l'alimentation d'entrée avant d'installer l'appareil ou d'effectuer l'entretien. Verrouillez ou étiquetez la sortie d'alimentation selon la norme OSHA 29 CFR 1910.147 (reportez-vous aux Principales normes de sécurité).
- Installez le poste correctement et mettez-le à la terre conformément aux consignes de ce manuel et aux normes nationales, provinciales et locales.
- Assurez-vous que le fil de terre du cordon d'alimentation est correctement relié à la borne de terre du sectionneur ou que la fiche du cordon est branchée à une prise correctement mise à la terre – vous devez toujours vérifier la mise à la terre avant toute mise sous tension.
- Avant d'effectuer les connexions d'alimentation, vous devez connecter en premier lieu le fil de terre - contrôlez les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse; protégez-les contre les étincelles et les pièces métalliques chaudes.
- Assurez-vous régulièrement que les câbles d'alimentation et de masse ne sont pas endommagés ou dénudés par endroit. Remplacez-les immédiatement si c'est le cas : un câble dénudé peut provoquer la mort. Contrôlez la continuité de la mise à la terre.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Dans le cas d'équipements refroidis par eau, contrôlez les conduites et raccords; remplacez-les s'ils présentent des fuites. N'utilisez pas d'équipement électrique si vous êtes mouillé ou dans une zone humide.
- Utilisez uniquement un équipement en bonne condition. Réparez ou remplacez immédiatement toute pièce endommagée.
- Portez un harnais de sécurité si vous devez travailler au-dessus du sol.
- Maintenez en place les panneaux, couvercles et protections de sécurité.



LES ÉTINCELLES VOLANTES risquent de provoquer des blessures.

Des étincelles peuvent jaillir de la soudure.

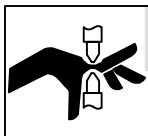
- Portez une visière ou des lunettes de sécurité avec des écrans latéraux approuvés.
- Portez un équipement de protection: gants en cuir résistant au feu, chemise épaisse, pantalon sans revers, chaussures de sécurité et casquette. Les matériaux synthétiques ne garantissent pas une bonne protection.
- Protégez les autres occupants du local à l'aide d'un rideau ou d'un écran ignifuge approprié. Assurez-vous que ces personnes portent des lunettes de sécurité avec protections latérales.



LE MÉTAL CHAUD peut provoquer des brûlures.

Portez des gants ou laissez refroidir les électrodes avant de procéder à l'entretien.

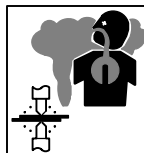
- Portez toujours de gants de soudeur lorsque vous utilisez cet équipement.
- Ne touchez pas les pièces ni les électrodes avec les mains.
- Laissez les électrodes refroidir avant de les toucher.



DES ORGANES MOBILES peuvent provoquer des blessures.

Pendant le soudage, les bras et électrodes se déplacent.

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement.
- Ne placez pas les mains entre les électrodes.
- Maintenez en place les panneaux et protections de sécurité.
- Les applications peuvent nécessiter des protections supplémentaires d'après les codes de sécurité locales.



LES FUMÉES peuvent être dangereuses.

Lors du soudage, les revêtements, produits de nettoyage, peintures et placages peuvent dégager des fumées. Leur inhalation peut être dangereuse.

- Ne respirez pas les fumées.
- Si vous soudez à l'intérieur, ventilez le local et/ou ayez recours à une ventilation aspirante installée près de la soudure pour évacuer les fumées.
- Dans des lieux exigus, utilisez un appareil respiratoire approprié.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.
- Veuillez lire les consignes de sécurité et les instructions du fabricant pour les métaux, revêtements et produits de nettoyage.

2-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



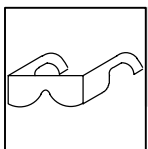
Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer ni faire fonctionner l'appareil à proximité de substances inflammables.
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



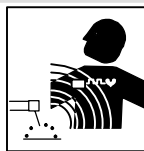
LA CHUTE DE L'ÉQUIPEMENT peut blesser.

- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- Faites déplacer les équipements portables par deux personnes dotées d'une force suffisante.
- Durant le transport, immobilisez l'appareil pour éviter qu'il ne bascule.



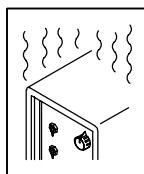
DES PIÈCES DE MÉTAL ou DES SALETÉS peuvent provoquer des blessures aux yeux.

- Porter des lunettes de sécurité à coques latérales ou un écran facial.



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage par points.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement; respecter le cycle opératoire nominal.
- Réduire le facteur de marche avant de poursuivre le soudage.

2-4. Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

2-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

L'extrait suivant est tiré des conclusions générales du document intitulé *Biological Effects of Power Frequency Electric & Magnetic Fields – Background Paper*, OTA-BP-E-53 (Washington DC : U.S. Government Printing Office, mai 1989), publié par le Office of Technology Assessment du Congrès américain : «... il existe maintenant d'abondantes données scientifiques compilées à la suite d'expériences sur la cellule ou d'études sur des animaux et des humains, qui montrent clairement

que les champs électromagnétiques basse fréquence peuvent avoir des effets sur l'organisme et même y produire des transformations. Même s'il s'agit de travaux de très grande qualité, les résultats sont complexes. Cette démarche scientifique ne nous permet pas d'établir un tableau d'ensemble cohérent. Pire encore, elle ne nous permet pas de tirer des conclusions finales concernant les risques éventuels, ni d'offrir des conseils sur les mesures à prendre pour réduire sinon éliminer les risques éventuels». (Traduction libre)

SECTION 3 – INTRODUCTION

3-1. Specifications

Model	AC Input Voltage 50/60 Hz 1-Phase	Work Capacity Combined Thickness Mild Steel	Rated Output At 50% Duty Cycle*	Welder Dimensions			Weight	
				Height	Width	Length	Net	Ship
MSW-41T	110	1/8 in (3.2 mm)	1.5 kVA	6 in (152 mm)	4-1/2 in (114 mm)	13 in (330 mm)	34 lb (15.4 kg)	38 lb (17.2 kg)
LMSW-52T	220	3/16 in (4.7 mm)	2.5 kVA	6 in (152 mm)	4-1/2 in (114 mm)	16 in (406 mm)	42 lb (19.1 kg)	45 lb (20.4 kg)


*Based on 10 second time period; means unit can weld for 5 seconds out of each 10 second time period.

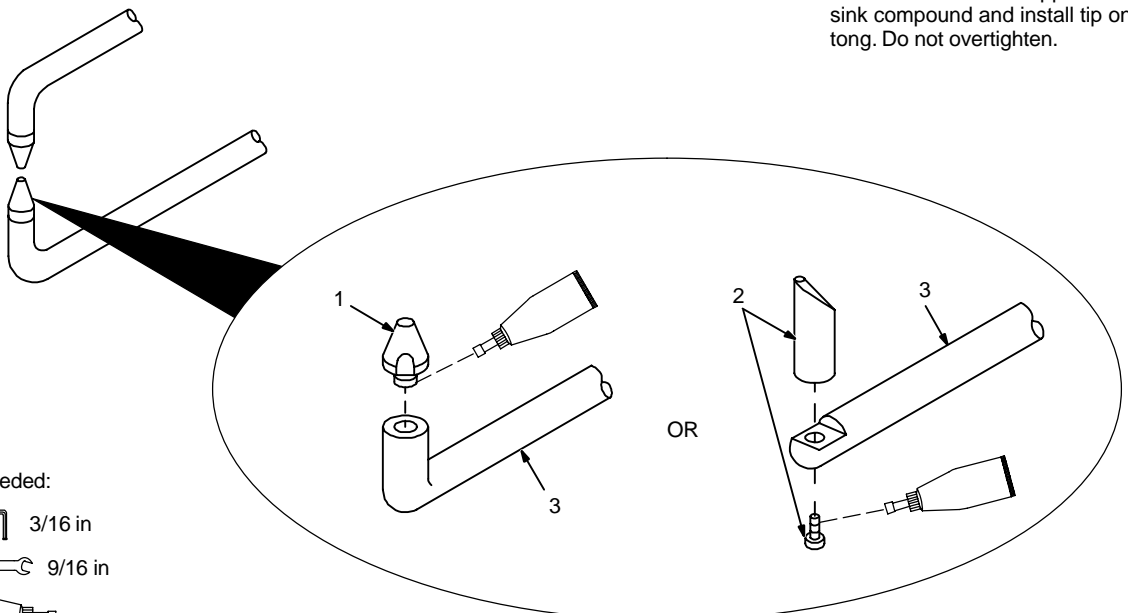
Model	MSW-41, 41T			LMSW-52, 52T		
Tong Length	6 in (152 mm)	12 in (305 mm)	18 in (457 mm)	6 in (152 mm)	12 in (305 mm)	18 in (457 mm)
Input Volts	110			220		
Output Amps $\pm 10\%$	5500	4500	3600	6750	5800	4850

SECTION 4 – INSTALLATION

4-1. Installing Or Dressing Tips

A. Installing Tips


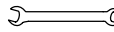

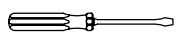




- 1 Threaded Tip
- 2 Tip With Hexhead Screw
- 3 Tong

Coat threads with supplied heat sink compound and install tip onto tong. Do not overtighten.

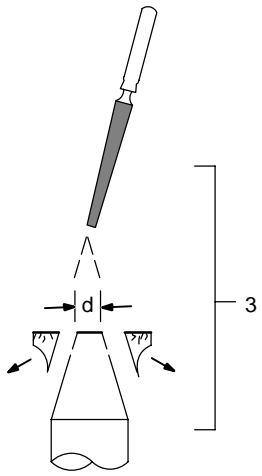
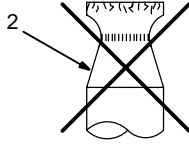
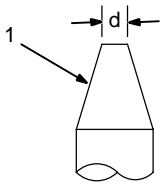
Tools Needed:

-  3/16 in
-  9/16 in
- 
- 

Ref. ST-800 155-B / Ref. ST-800 154


B. Dressing The Tips

$d < 1/8$ in (3.2 mm)
diameter
for 1.5 kVA models;
 $5/32$ in (4 mm)
for 2.5 kVA models

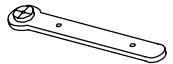


1 New Tip
2 Used Tip Requiring Dressing
3 Dressing Method – Keep top diameter same as a new tip.

Tools Needed:



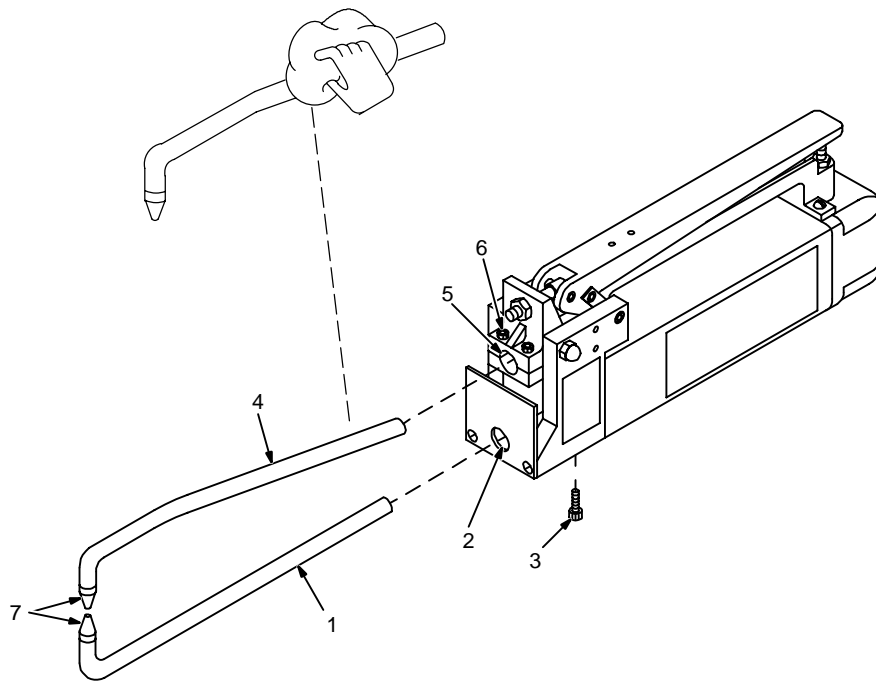
OR



4-2. Installing Or Cleaning Tongs



▲ OSHA and/or local codes may require additional guarding to suit the application.



▲ Turn off and unplug welder.

☞ Be sure tong ends are clean and not corroded before installing. Clean tongs with fine steel wool.

Bottom Tong:

- 1 Bottom Tong
- 2 Hole In Spatter Guard
- 3 Bottom Tong Securing Screws (4)

Loosen the four screws. If needed, use a rubber mallet to loosen tong.

Slide tong into bottom tong holder as far as possible, and position so that tip is pointing straight up.

Loosely tighten screws.

Top Tong:

- 4 Top Tong
- 5 Top Tong Holder/Pivot Casting
- 6 Top Tong Securing Screws (4)

Loosen the four screws. If needed for removal, use a rubber mallet to loosen tong.

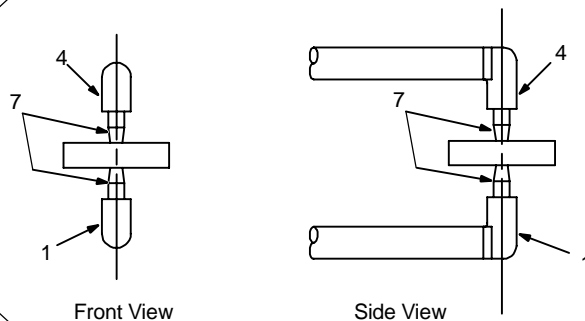
Slide tong into pivot casting as far as necessary, so that tip mates with bottom tip when tongs are closed.

Loosely tighten screws.

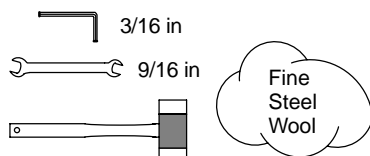
- 7 Tips

Adjust tong positions to line up centers of tips as shown. Tighten screws.

Tong Alignment

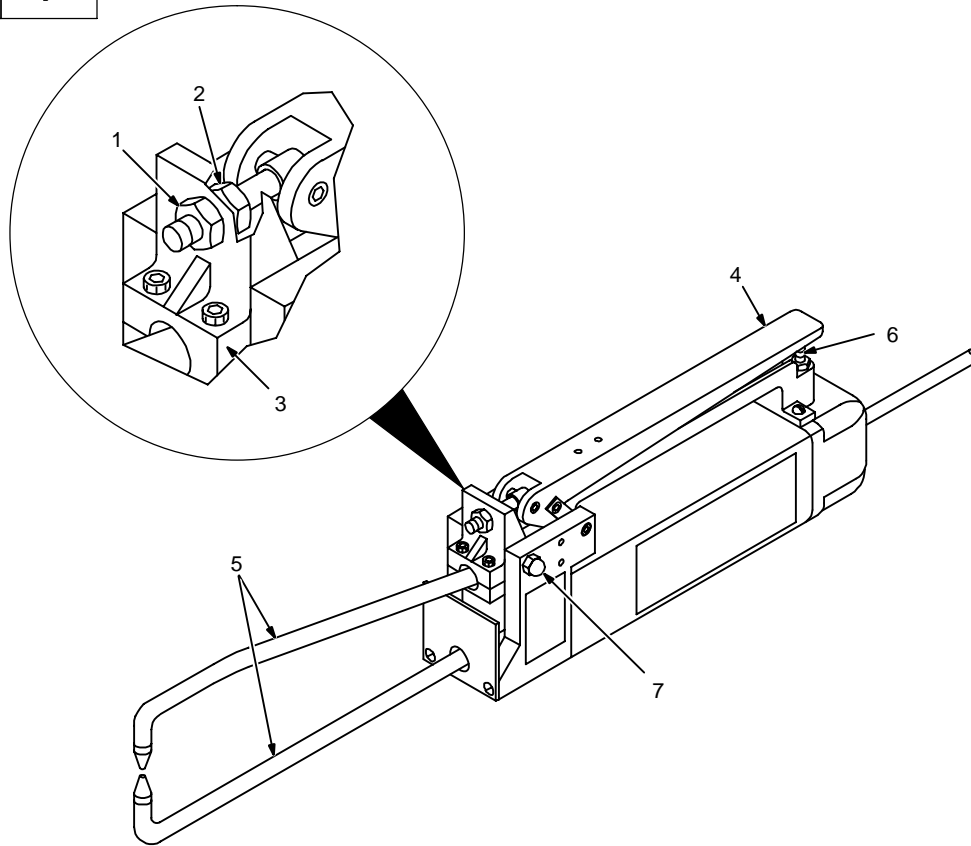


Tools Needed:

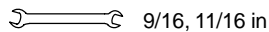


ST-800 155-A / Ref. ST-800 154-A

4-3. Adjusting Tong And Hand Lever Pressure



Tools Needed:



9/16, 11/16 in

Ref. ST-800 156

▲ Turn off and unplug welder.

▲ Excessive tong pressure can damage tips. Do not use tongs as a clamp or vice to hold workpiece together. If the two pieces of material to be welded do not make good contact at the point of the intended weld, clamp material to provide good contact between surfaces.

☞ Tong pressure is adjustable, and must be checked and/or set before operation. Correct tong pressure is necessary to create a quality weld and to prevent damage to tips.

Too much tong pressure causes the weld nugget to dimple and material to

splash out around the nugget area.

If tong pressure is too weak, parts are loose when the tongs close, severe arcing occurs between workpieces, and no weld can be made.

- 1 Front Nut
- 2 Rear Nut
- 3 Pivot Casting
- 4 Hand Lever
- 5 Tongs

To increase tong pressure, loosen front nut. The farther the front nut is turned out, the greater the pressure on the tips when the hand lever is closed. Turn the rear nut up to the pivot casting to lock the position.

To decrease tong pressure, loosen the rear nut and turn the front nut up to the pivot casting.

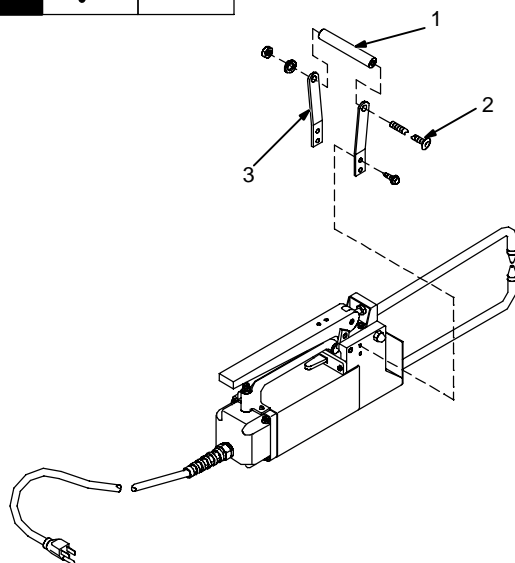
6 Machine Screw

The farther down the screw is turned, the farther the hand lever will close. Adjustment of this screw will determine if the tongs lock on the material, or just pull up tight. Adjust screw to allow lever to be raised easily after the weld has been completed.

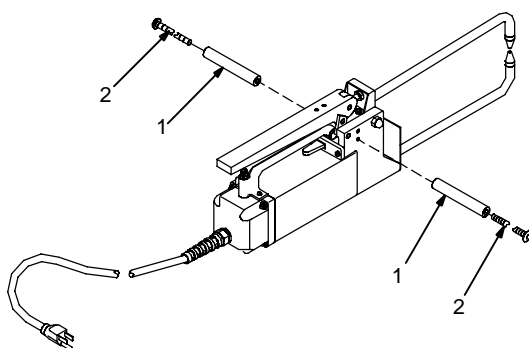
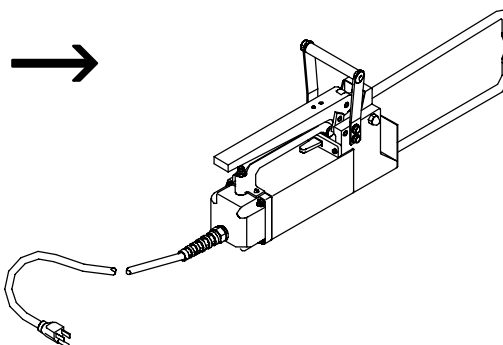
7 Hex Nut

To adjust pressure needed to push down hand lever, turn the hex nuts located on each side of the pivot casting.

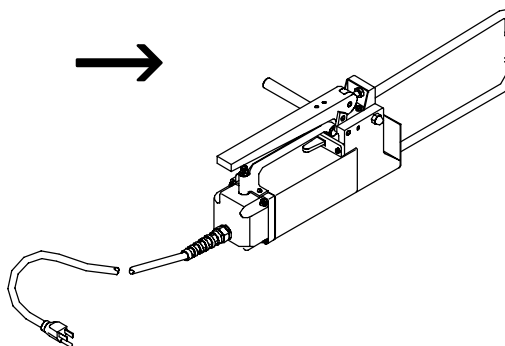
4-4. Installing Handle



MSW 41 And 41T Models



MSW 52, And 52T Models



Tools Needed:

 7/16, 3/8 in

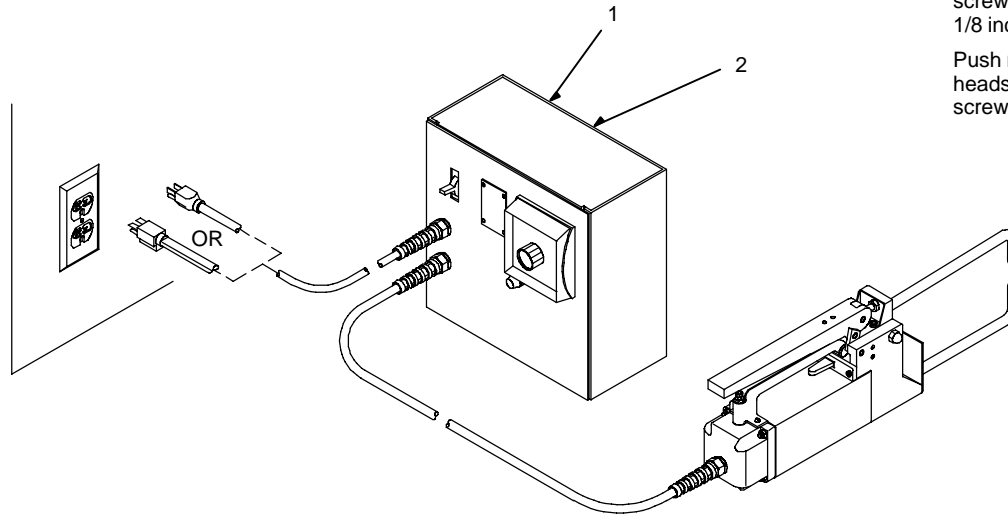
▲ **Turn off and unplug welder.**

- 1 Wooden Handle
- 2 Handle Bolt
- 3 Brackets (41 And 41T Models Only)

Install handle onto the spot welder as shown above. For 52, and 52T Models, install handle onto either side as desired for either right-hand or left-hand use.

Ref. ST-802 056-A

4-5. Mounting Control Box



Push-in slots are provided on rear of box for wall mounting if desired. The slots will fit over 1/4 inch hex-head screws. To mount box, proceed as follows:

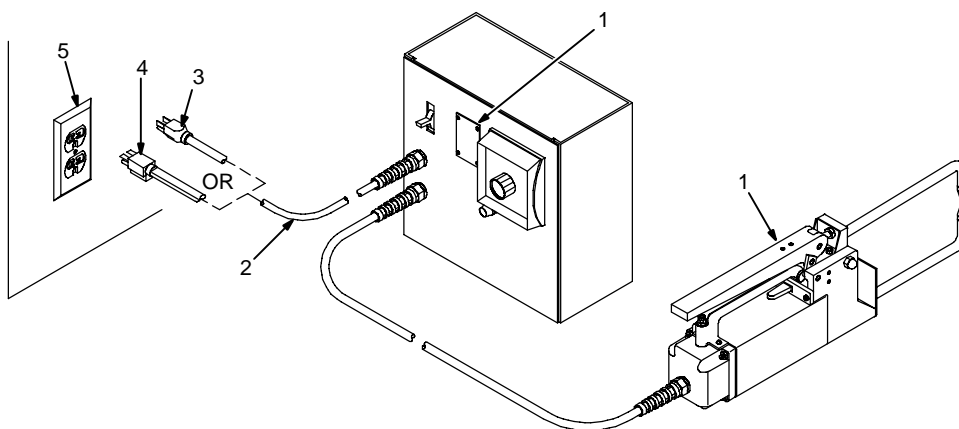
- 1 Control Box
- 2 Push-In Slots (Not Shown)

Use slots as template and install screws at desired locations leaving 1/8 inch stickout.

Push rear slots firmly against screw heads, and slide box down onto screws.

ST-800 233-A

4-6. Connecting Input Power (T Models)



Operate spot welder from a separately fused or circuit breaker protected circuit, and use correct size input conductors.

- 1 Rating Label (Not Visible As Shown On Spot Welder)
- 2 Cord
- 3 Parallel Plug On 110 Volts AC Models
- 4 Tandem Plug On 220 Volts AC Models

Do not cut ground terminal off plug.


- 5 Grounded Receptacle

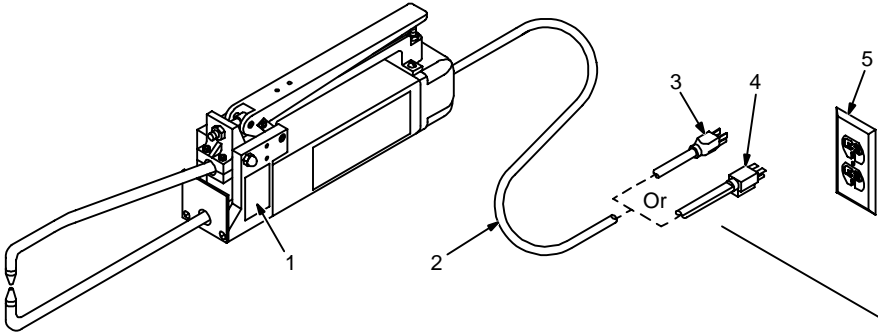
Connect plug to matching grounded receptacle.

Model	Input Conductor Size (AWG)	Fuse/Circuit Breaker Size In Amperes
1.5 kVA 110 Volt	No. 10	30
1.5 kVA 220 Volt	No. 12	15
2.5 kVA 220 Volt	No. 10	30

Ref. ST-800 233-A

4-7. Connecting Input Power (Non-T Models)





▲ Input power supply wiring and receptacle must meet National Electrical Code and all other code requirements.

Operate spot welder from a separately fused or circuit breaker protected circuit, and use correct size input conductors.

- 1 Rating Label
- 2 Cord
- 3 Parallel Plug On 110 Volts AC Models
- 4 Tandem Plug On 220 Volts AC Models
- 5 Grounded Receptacle

Do not cut ground terminal off plug.

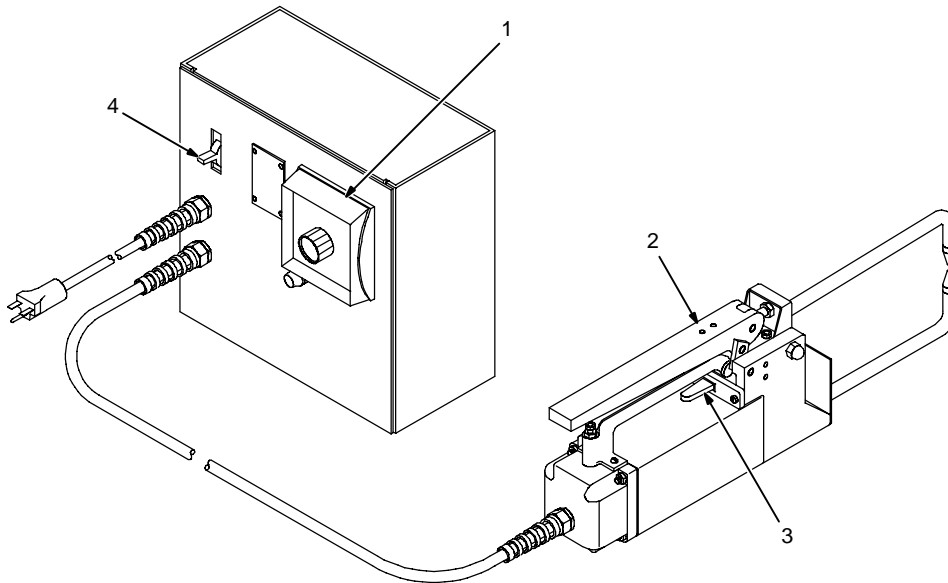
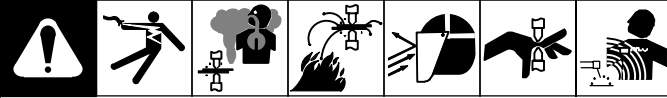
Connect plug to matching grounded receptacle.

Model	Input Conductor Size (AWG)	Fuse/Circuit Breaker Size In Amperes
1.5 kVA 110 Volt	No. 10	30
2.5 kVA 220 Volt	No. 10	30

Ref. ST-800 156

SECTION 5 – OPERATION

5-1. Controls (T Models)



1 Spot Weld Timer And Pilot Light

Weld time adjusts from 0 to 5 seconds. The pilot light turns on when the weld cycle begins and off when the cycle ends.

2 Hand Lever

Use lever to open and close tongs. Close the hand lever during the welding process to compress the material between the tips. To adjust tong pressure, see Section 4-3.

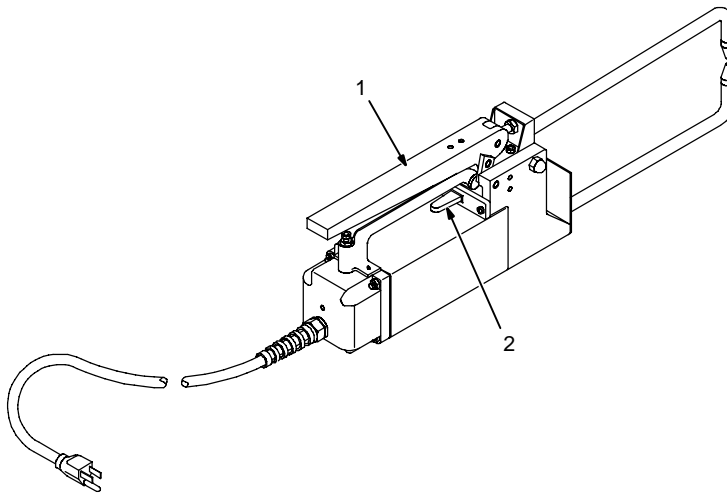
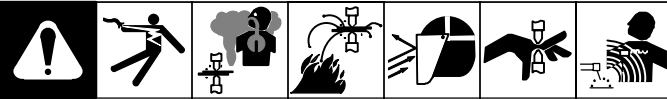
3 Start Switch

Move start switch sideways in either direction to start weld cycle. When weld cycle time ends, or the start switch is released, weld output stops, and the timer resets for another weld cycle.

4 Power Switch

ST-146 013-B

5-2. Controls (Non-T Models)



1 Hand Lever

Use lever to open and close tongs. Close the hand lever during the welding process to compress the material between the tips. To adjust tong pressure, see Section 4-3.


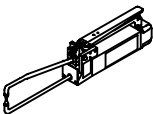

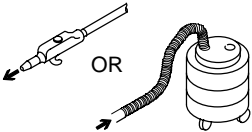
2 Start Switch

Use switch to turn weld current On and Off. Move switch sideways in either direction to start weld current. Release switch to stop weld current.

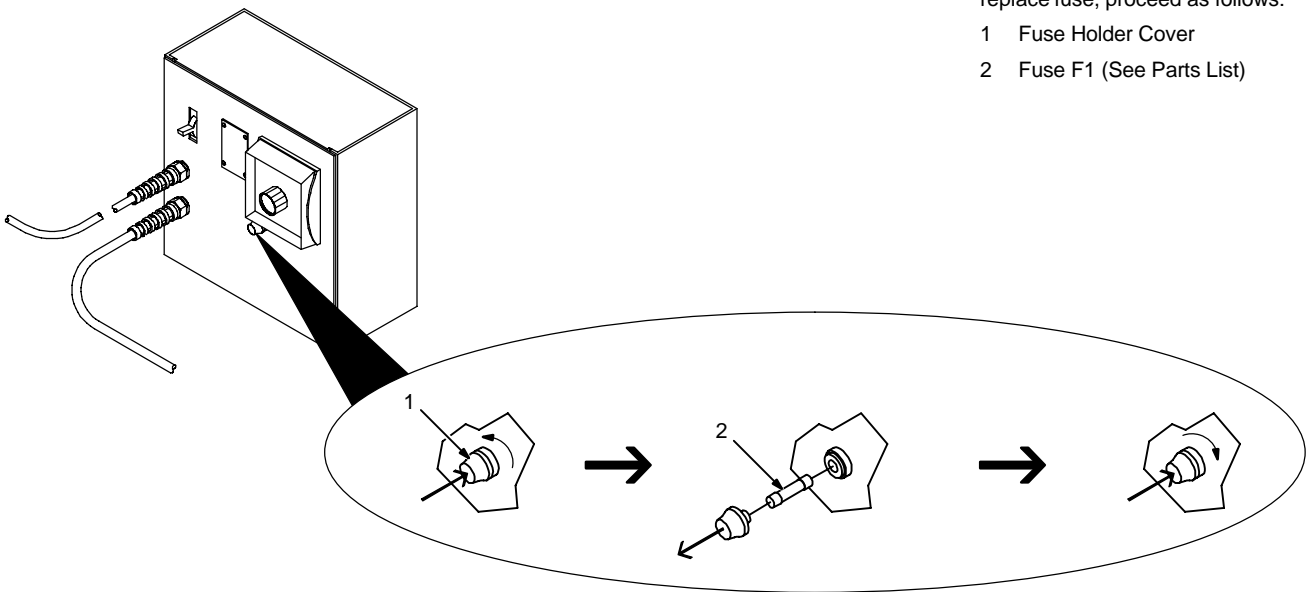
ST-145 104-A

SECTION 6 – MAINTENANCE AND TROUBLESHOOTING

6-1. Routine Maintenance

					▲ Disconnect power before maintaining.	
Every Use		3 Months		6 Months		
						Inspect Tips Replace Unreadable Labels Blow Off Or Vacuum Unit During Heavy Service, Clean Monthly

6-2. Overload Protection For 220 Volts Model



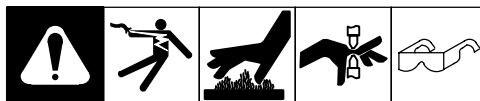
▲ Turn Off unit and disconnect input power.

If fuse opens, unit shuts down. To replace fuse, proceed as follows:

- 1 Fuse Holder Cover
- 2 Fuse F1 (See Parts List)

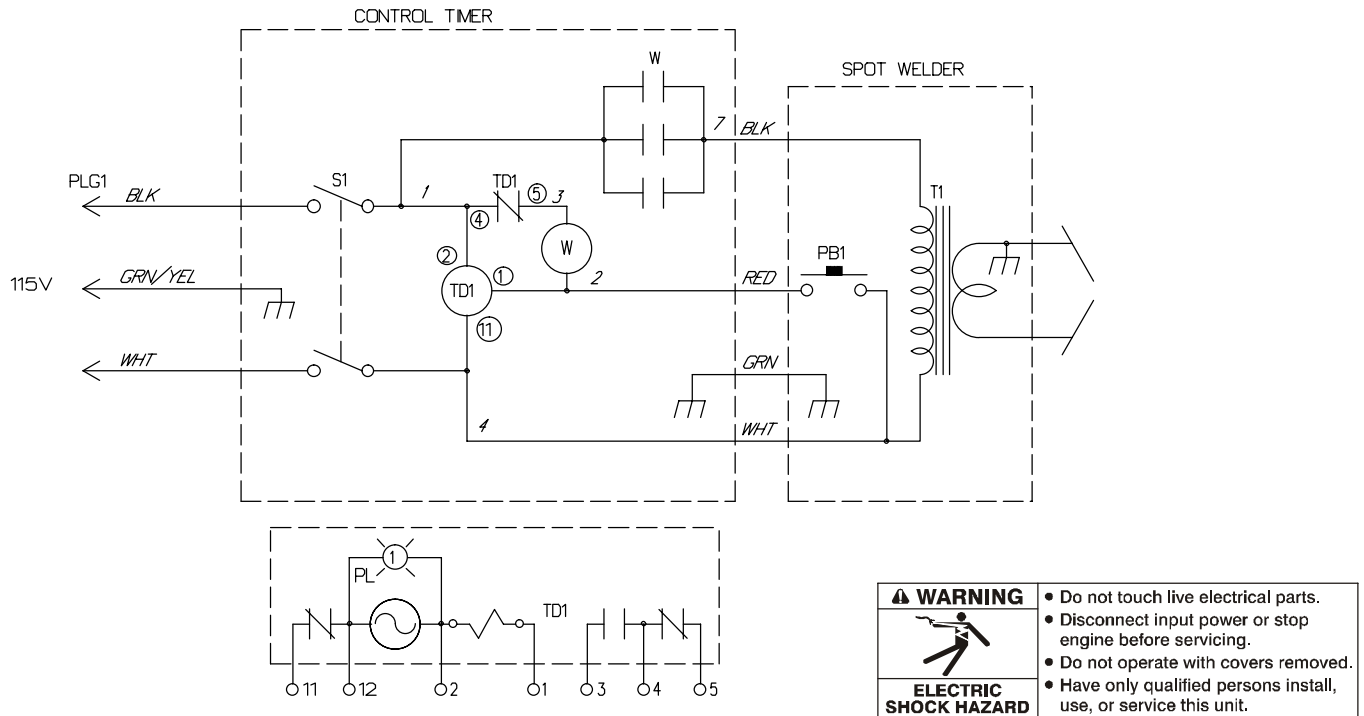
Ref. ST-800 233-A / Ref. ST-800 185-A

6-3. Troubleshooting

				
Trouble	Remedy			
No weld output.	Check line fuses, and replace if necessary.			
	For 220 V models, check fuse F1, and replace if necessary (see Section 6-2).			
Low weld output.	Dress or replace tips (see Section 4-1).			
	Check tip threads. Replace tips if necessary (see Section 4-1).			
	Remove and clean tongs (see Section 4-2).			

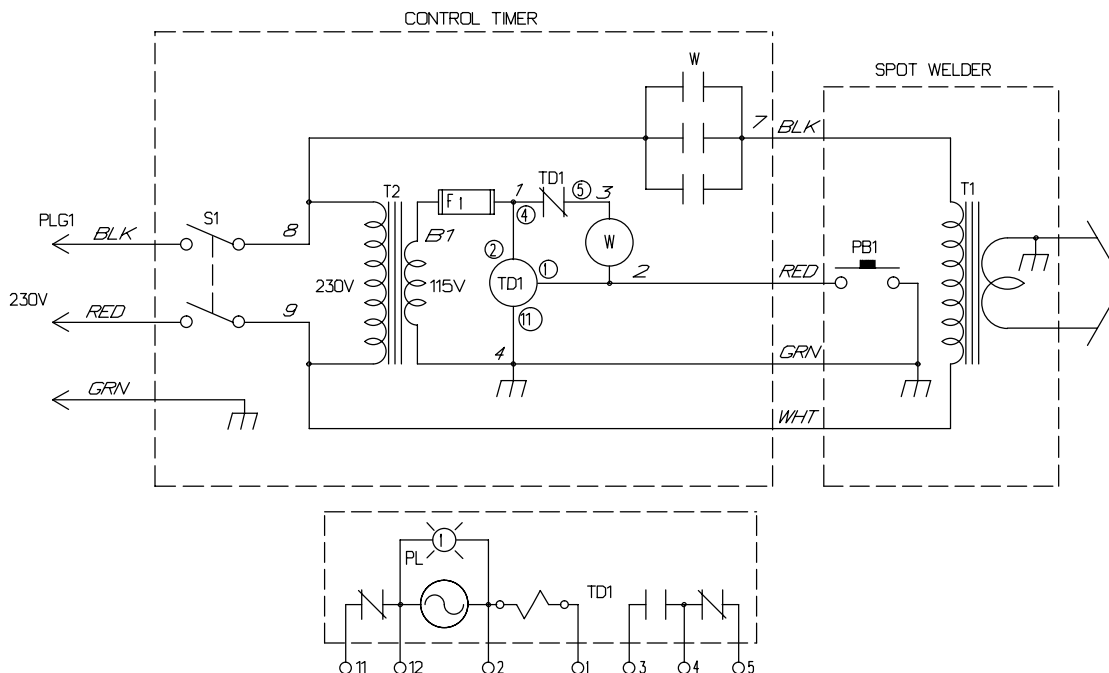
Trouble	Remedy
	Clean ends of tongs and tong holders (see Section 4-2).
	Check power switch (T models only) and/or start switch. Replace if necessary.
Longer than normal weld time required.	Dress or replace tips (see Section 4-1).
	Clean workpieces.
	Adjust tong pressure (see Section 4-3).
	Clean ends of tongs and tong holders (see Section 4-2).
	Check input line voltage.
Burn through at point of weld.	Shorten weld time (see Section 5-1).
	Adjust tong pressure (see Section 4-3).
	Dress or replace tips (see Section 4-1).
	Realign tips (see Section 4-2).

SECTION 7 – ELECTRICAL DIAGRAMS



SA-162 466-B


Figure 7-1. Circuit Diagram For 110 Volts T-Models

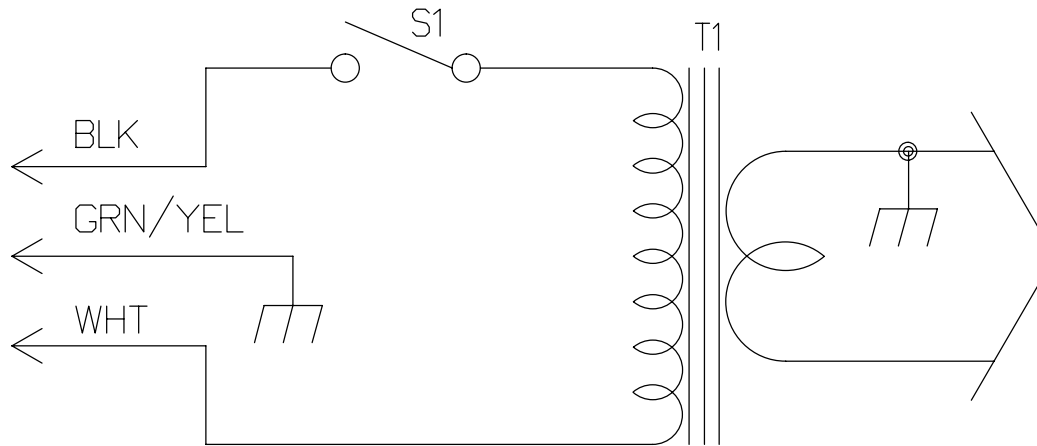


SA-072 065-B

Figure 7-2. Circuit Diagram For 220 Volts T-Model

[Return To Table Of Contents](#)


⚠ WARNING	<ul style="list-style-type: none"> • Do not touch live electrical parts.
	<ul style="list-style-type: none"> • Disconnect input power or stop engine before servicing.
ELECTRIC SHOCK HAZARD	<ul style="list-style-type: none"> • Do not operate with covers removed. • Have only qualified persons install, use, or service this unit.

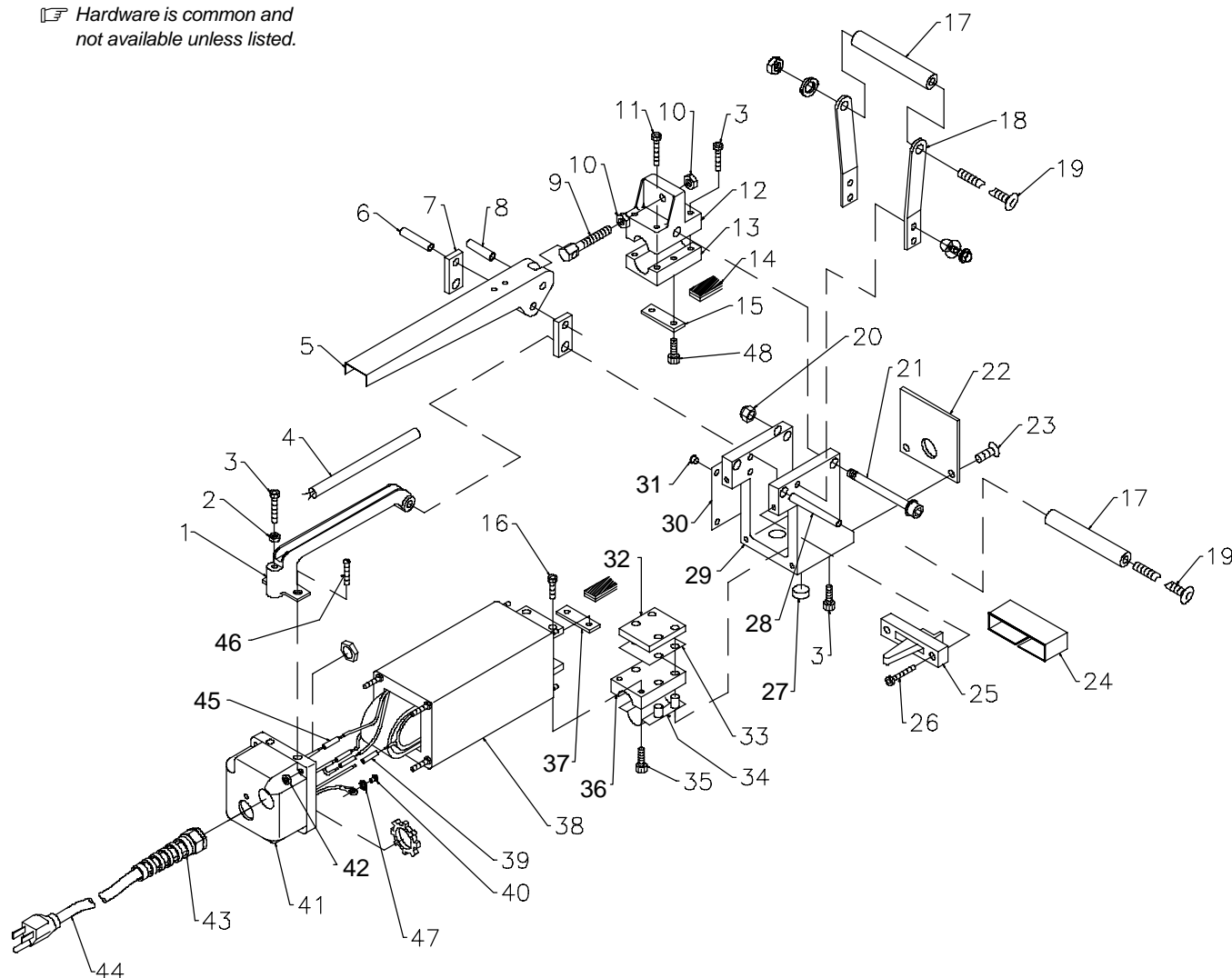


SA-162 467-B

Figure 7-3. Circuit Diagram For 110 And 220 Volts Non-T Models

SECTION 8 – PARTS LIST

 Hardware is common and not available unless listed.



ST-145 048-D

Figure 8-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity	
				Model	
				41,41T	52,52T

Figure 8-1. Main Assembly

...	1	...	019 643 ..	HANDLE, carrying	1	
...	1	...	019 646 ..	HANDLE, carrying	1	1
...	2	...	601 865 ..	NUT, stl hex full fnsh .250-20	1	1
...	3	...	602 009 ..	SCREW, cap stl sch .250-20 x 1.250	7	7
...	4	...	023 660 ..	WIRING HARNESS, switch	1	1
...	5	...	023 199 ..	LEVER, operating	1	
...	5	...	082 090 ..	LEVER, operating		1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity	
				Model	
				41,41T	52,52T
Figure 8-1. Main Assembly (continued)					
6		010 714	PIN, spring CS .312 x 1.750	1	1
7		010 712	LINK, tgl connecting	2	2
8		010 713	PIN, spring CS .312 x 1.250	1	1
9		010 715	BOLT, pressure adjustment	1	1
10		601 876	NUT, stl hex jam .437-20	2	2
11		010 668	SCREW, cap stl sch .250-20 x 1.500	2	3
12		017 668	HOLDER, tong top	1	1
13		010 709	CLAMP, tong top	1	1
14		010 623	BRAID, tong set of four	1	1
15		010 716	CLAMP, connecting top tong braid	1	1
16		602 008	SCREW, .250-20 x 1.000soc hexhd	2	2
17		602 262	HANDLE, wood	1	1
18		024 130	BRACKET, mtg handle	2	
19		601 778	BOLT, crg stl .250-20 x 4.500	1	1
20		204 608	NUT, 312-18 .50hex .34h stl pld elastic stop nut	1	1
21		213 080	SCREW, 3/8 X 3 soc shoulder	1	1
22		026 607	GUARD, spatter	1	1
23		128 237	SCREW, 10-32 x .500hexwhd slt stl	2	2
24		070 017	INSULATION, switch	1	1
25	S1	*011 746	SWITCH, control (consisting of)	1	1
		011 291	CONTACT, assembly switch	1	1
		023 987	CONTACT, switch	1	1
		011 292	TOGGLE, switch	1	1
		070 035	BASE	1	1
26		122 210	SCREW, 10-32 x .625hexwhd slt stl	2	2
27		026 759	INSULATOR, plug sec scr	2	2
28		010 711	PIN, spring .375-3.00	1	1
29		169 122	HOUSING, front	1	1
30			NAMEPLATE (order by model and style number)	1	1
31		602 024	SCREW, drive U 2 x 3/16	4	4
32		010 708	RETAINER, clamp tong	1	1
33		026 605	INSULATION, bottom clamp	1	1
34		181 179	INSULATION, tong	1	1
35		602 004	SCREW, cap stl sch .250-20 x .750	2	2
36		010 707	CLAMP, bottom tong	1	1
37		039 052	CLAMP, threaded connecting tong braid (included w/Item 5, Fig 8-2)	1	1
38	T1	+095 345	TRANSFORMER, pwr main (Fig 8-2)	1	
38	T1	+095 354	TRANSFORMER, pwr main (Fig 8-2)		1
		143 140	LABEL, warning general precautionary	1	1
39		600 675	SPLICE, butt 16-14 wire	1	1
40		082 193	SCREW, 010-32X .37 hexwhd-slt stl pld slffmg tap-rw	1	1
41		019 642	COVER	1	1
42		601 847	NUT, stl slflkg hex mscr 10-32	4	4
43		134 900	STRAIN RELIEF, cable flexible .270-.480 cable	1	1
44		094 503	CABLE, pwr 10ft 16ga 3/C (Not Req On T Models)	1	
44		094 504	CABLE, pwr 10ft 16ga 3/C (Not Req On T Models)		1
45		026 763	TUBING, gl acrylic No. 7 x 2.500	3	3
46		128 237	SCREW, 10-32 x .500hexwhd slt stl	2	2
47		602 205	WASHER, tooth.195idx0.381odx.025t stl pld int #10 a	1	1
48		217 299	SCREW, 250-20X .87 soc hd-hex gr8 pln	2	2

*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and style number required when ordering parts from your local distributor.

Replace Coils At Factory Or Factory Authorized Service Station.

Item No.	Part No.	Description	Quantity	
			Model	
			41,41T	52,52T
Figure 8-2. Transformer, Power Main (Fig 8-1- Item 38)			095 345	095 354
... 1	026 601	.. INSULATION	1	
... 1	026 602	.. INSULATION		1
... 2	095 312	.. COIL, pri 115V	1	
... 2	095 308	.. COIL, pri 230V		1
... 3	010 157	.. STUD, stl No. 10-32 x 8.125	4	
... 3	010 156	.. STUD, stl No. 10-32 x 11.125		4
... 4	137 943	.. NUT, core stud	4	4
... 5	+033 123	.. BAR, sec	1	
... 5	+033 122	.. BAR, sec		1

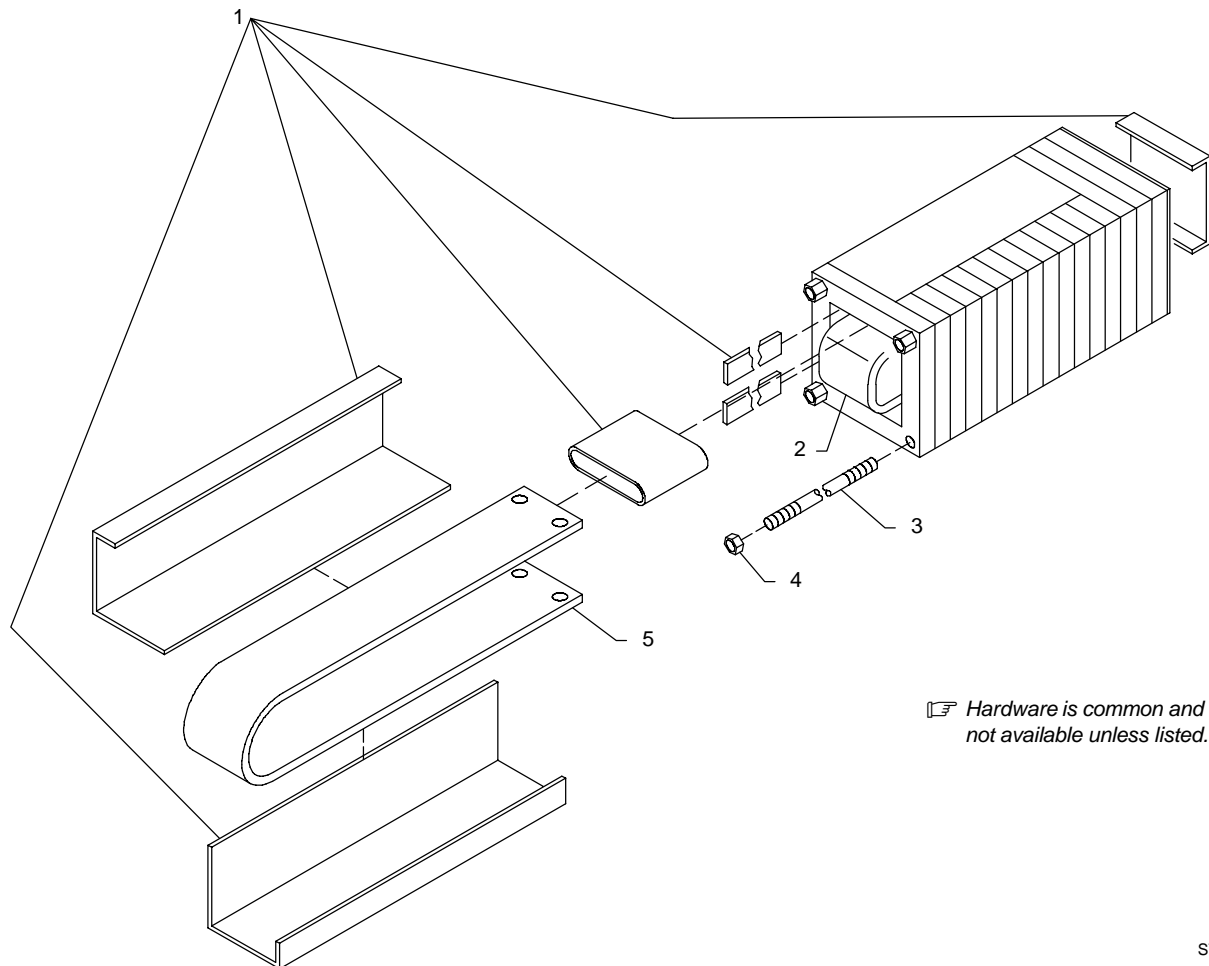


Figure 8-2. Transformer, Power Main

ST-141 482-A

+Item 37 on Figure 8-1 is included when ordering these items as replacement parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and style number required when ordering parts from your local distributor.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity	
				Model	
				115V	230V

Figure 8-3. Timer, Spot (230V Illustrated)

041 081 041 082

... 1	NAMEPLATE, (order by model and style numbers)	1	...	1
... 2	... S1	124 511	SWITCH, tgl DPST 40A 600VAC	1	...	1
... 3	... W	194 307	CONTACTOR, 40A 3P (consisting of)	1	...	1
...	...	188 210	LINK, connecting contactor terminal	2	...	2
... 4	...	032 152	CABINET	1	...	1
... 5	... T2	605 856	TRANSFORMER, control 230/460	1	...	1
... 6	...	168 308	PANEL, front	1	...	1
... 7	... TD1	605 952	TIMER, delay reset 5sec 120V	1	...	1
... 8	...	046 432	HOLDER, fuse	1	...	1
... 9	... F1	*012 653	FUSE, mintr gl .5A	1	...	1
... 10	...	087 179	CABLE, interconnecting 10ft	1	...	1
... 11	... PLG1	096 822	CABLE, pwr 10ft 16ga 3/c	1	...	1
... 11	... PLG1	096 481	CABLE, pwr 10ft 16ga 3/c	1	...	1
... 12	...	134 900	STRAIN RELIEF, cable flexible .270-.480 cable	2	...	2

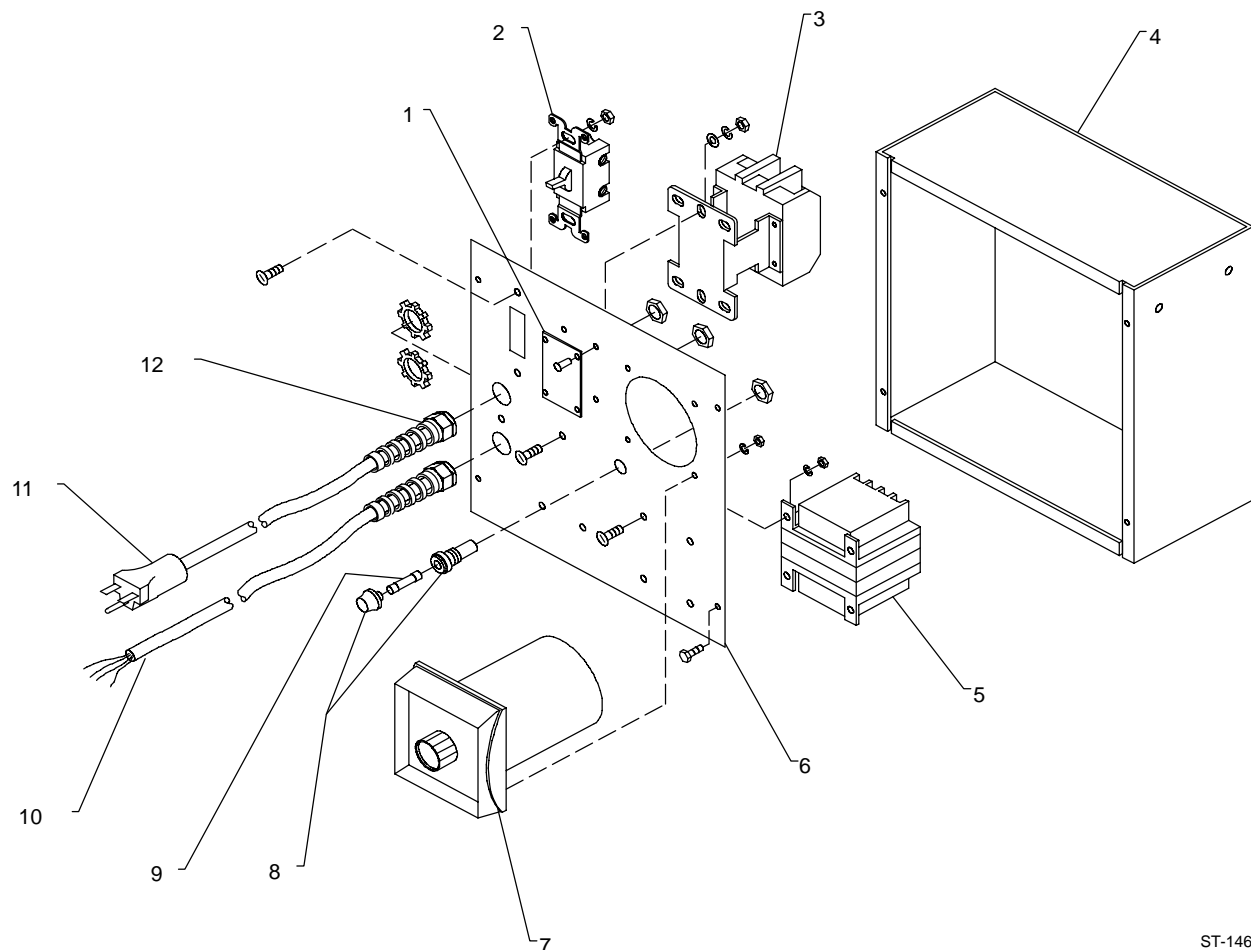


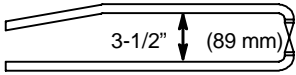
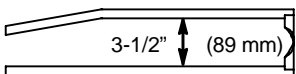
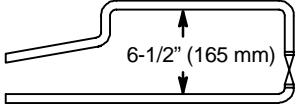
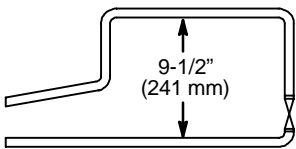
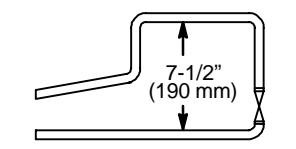

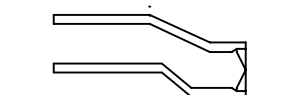
Figure 8-3. Timer, Spot (230V Illustrated)

ST-146 012-E

*Recommended Spare Parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and style number required when ordering parts from your local distributor.

Figure 8-4. Spot Welder Tips

 <p>STANDARD</p>	<p>6" (152 mm) 040 197 12" (305 mm) 040 198 18" (457 mm) 040 199</p>	<p>Standard Flat</p> <p>040 211 040 212</p>
 <p>MO OFFSET</p>	<p>6" (152 mm) 040 200 12" (305 mm) 040 201 18" (457 mm) 040 202</p>	<p>MO Offset</p> <p>040 215</p>
 <p>TT-6</p>	<p>12" (305 mm) 040 203 18" (457 mm) 040 204</p>	<p>Standard Flat</p> <p>040 211 040 212</p>
 <p>TT-9</p>	<p>12" (305 mm) 040 205 18" (457 mm) 040 206</p>	<p>Standard Flat</p> <p>040 211 040 212</p>
 <p>G-7</p>	<p>8" (203 mm) 040 207</p>	<p>Standard Flat</p> <p>040 211 040 212</p>
 <p>FF</p>	<p>8" (203 mm) 040 208</p>	<p>FF</p> <p>040 213</p>
 <p>FH</p>	<p>5" (127 mm) 040 209</p>	<p>FH</p> <p>040 214</p>

S-0550

TRUE BLUE® WARRANTY

Effective January 1, 2003
(Equipment with a serial number preface of "LC" or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

Warranty Questions?

Call
1-800-4-A-MILLER
for your local
Miller distributor.

Your distributor also gives
you ...

Service

You always get the fast,
reliable response you
need. Most replacement
parts can be in your
hands in 24 hours.

Support

Need fast answers to the
tough welding questions?
Contact your distributor.
The expertise of the
distributor and Miller is
there to help you, every
step of the way.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts — 3 Years Labor
 - * Original main power rectifiers
 - * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
 - * Transformer/Rectifier Power Sources
 - * Plasma Arc Cutting Power Sources
 - * Semi-Automatic and Automatic Wire Feeders
 - * Inverter Power Supplies
 - * Intellitig
 - * Maxstar 150
 - * Engine Driven Welding Generators
(NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor Unless Specified
 - * DS-2 Wire Feeder
 - * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
 - * Process Controllers
 - * Positioners and Controllers
 - * Automatic Motion Devices
 - * RFCS Foot Controls
 - * Induction Heating Power Sources
 - * Water Coolant Systems
 - * Flowgauge and Flowmeter Regulators (No Labor)
 - * HF Units
 - * Grids
 - * Maxstar 85, 140
 - * Spot Welders
 - * Load Banks
 - * Racks
 - * Running Gear/Trailers
 - * Plasma Cutting Torches (except APT & SAF Models)
 - * Field Options
(NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
 - * MIG Guns/TIG Torches

- * Induction Heating Coils and Blankets
- * APT & SAF Model Plasma Cutting Torches
- * Remote Controls
- * Accessory Kits
- * Replacement Parts (No labor)
- * Spoolmate Spoolguns
- * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear. (Exception: brushes, slip rings, and relays are covered on Bobcat, Trailblazer, and Legend models.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.





Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

City

State

Zip



For Service

Call 1-800-4-A-Miller or see our website at www.MillerWelds.com to locate a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

Welding Supplies and Consumables

Options and Accessories

Personal Safety Equipment

Service and Repair

Replacement Parts

Training (Schools, Videos, Books)

Technical Manuals (Servicing Information and Parts)

Circuit Diagrams

Welding Process Handbooks

Contact the Delivering Carrier to:

File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

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International Headquarters—USA

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USA & Canada FAX: 920-735-4134
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